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AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A text entry input system, comprising:  
a direction selector to individually point in a direction of letters to  
5 collectively form an intended linguistic object, where each letter comprises a  
linguistic object subcomponent;  
a collection of linguistic objects;  
an output device with a text display area;  
a processor, comprising:  
10 a difference calculation module configured to output, for each act of  
pointing, a letter and associated weight value based upon factors including  
at least an angular difference between an actual direction of pointing and  
pre-assigned directions of said letters;  
an object search engine configured to construct a predicted list of  
15 linguistic objects based on the output letters and weight values;  
a selection component to facilitate user selection of a desired  
linguistic object from the predicted list of linguistic objects.  
~~a directional selection means, plus one or more buttons or equivalent user~~  
~~input means;~~  
20 ~~a collection of linguistic objects;~~  
~~an output device with a text display area; and~~  
~~a processor which comprises an object search engine, a distance value~~  
~~calculation module, a linguistic object module for evaluating and ordering~~  
~~linguistic objects, and a selection component;~~  
25 ~~wherein said directional selection means is used to point in a direction of~~  
~~each of the letters, or the letters' sub word equivalents in each writing system, of~~  
~~a linguistic object, said processor calculating a distance to find letters and weight~~  
~~values for the letters in said pointing direction with said distance calculation~~  
~~module, said processor retrieving a predicted list of linguistic objects based on~~  
30 ~~the letters and weight values with said object search engine, said processor~~  
~~evaluating and ordering said predicted list of linguistic objects with said linguistic~~

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~~object module, and said selection component being used to select a desired linguistic object from said predicted list of linguistic objects.~~

2. (Currently Amended) The system of Claim 1, further comprising an on-screen keyboard representation of a ring of ~~letters or the letters' sub-word~~  
equivalents in each writing system the letters.

3. (Currently Amended) The system of Claim 2, wherein said on-screen keyboard is of any shape selected from a group comprising circle, square, oval,  
and polygon.

4. (Currently Amended) The system of Claim 1, further comprising a set of compass point letters, said compass point letters being placed at positions around in a linguistic object selection list, in a separate on-screen compass area,  
or around said directional selector. ~~selection means.~~

5. (Original) The system of Claim 2, wherein said letters have bottoms towards the center of said ring.

6. (Original) The system of Claim 2, wherein said letters have an alphabetical order, QWERTY order, or Dvorak order.

7. (Original) The system of Claim 2, wherein said letters start at the 12 o'clock or 9 o'clock position.

8. (Original) The system of Claim 2, wherein said letters have a moving starting position.

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9. (Original) The system of Claim 2, wherein said letters have a clockwise or counterclockwise layout.
10. (Original) The system of Claim 2, wherein each of said letters occupies  
5 different amount of radians depending upon use frequency.
11. (Currently Amended) The system of Claim 1, wherein a number of characters are printed around said directional selector. ~~input means.~~
- 10 12. (Currently Amended) The system of Claim 1, wherein said directional selector comprises ~~selection means is~~ a joystick or an omni-directional rocker switch.
13. (Currently Amended) The system of Claim 1, wherein each letter  
15 comprises any subcomponent or combination of one or more of the following forming an incomplete part of one of the linguistic objects:  
an alphabetic letter, numeric digit, symbol, character,  
a sub-word component from a non-English language including one or  
more strokes, radicals, jamos, kana, punctuation symbols, digits.
- 20 ~~The system of Claim 12, wherein said joystick has at least a 10° precision.~~
14. (Currently Amended) The system of Claim 1, further comprising wherein  
~~said one or more buttons or equivalent user input means is comprised of~~ at least  
four buttons independent of said directional selector. ~~selection means.~~
- 25 15. (Currently Amended) The system of Claim 1, where the weight values represent estimated probabilities that actually pointed to letters represent letters intended by the user.; ~~wherein said one or more buttons or equivalent user input means comprises a joystick or directional rocker switch.~~

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16. (Original) The system of Claim 12, wherein said joystick or omni-directional rocker switch is a component of a multi-function video game controller.

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17. (Currently Amended) The system of Claim 1,2, wherein said system provides auditory or visual feedback on each movement of said directional selector. ~~selection means.~~

10 18. (Original) The system of Claim 17, wherein said visual feedback is a solid or gradient-fill pie wedge shape appearing on said on-screen keyboard, said pie wedge shape being centered on a current selected direction.

15 19. (Original) The system of Claim 1, wherein said linguistic objects are ordered according to a linguistic model.

20 20. (Original) The system of Claim 19, where said linguistic model includes one or more of:

- frequency of occurrence of a linguistic object in formal or conversational written text;
- frequency of occurrence of a linguistic object when following a preceding linguistic object or linguistic objects;
- proper or common grammar of the surrounding sentence;
- application context of current linguistic object entry; and
- 25 recency of use or repeated use of the linguistic object by the user or within an application program.

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21. (Currently Amended) The system of Claim 1, wherein said list of predicted linguistic objects are ordered by a combination value of a calculated weighted difference distance value and a linguistic model.

- 5 22. (Original) The system of Claim 21, wherein said linguistic model comprises one or more of:
- frequency of occurrence of a linguistic object in formal or conversational written text;
  - frequency of occurrence of a linguistic object when following a preceding
  - 10 linguistic object or linguistic objects;
  - proper or common grammar of the surrounding sentence;
  - application context of current linguistic object entry; and
  - recency of use or repeated use of the linguistic object by the user or within
  - an application program.

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23. (Original) The system of Claim 21, wherein the linguistic object with the highest combination value is selected by default.

24. (Currently Amended) The system of Claim 1, wherein the linguistic
- 20 objects longer than the number of actions of direction selector ~~selection means~~ are included in said list of predicted linguistic objects.

25. (Original) The system of Claim 1, further comprising a means for extending a selected linguistic object with completions.

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26. (Original) The system of Claim 25, wherein said completions are displayed in a pop-up list after a button press or directional input.

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27. (Original) The system of Claim 1, further comprising a means for precisely selecting said letters of said linguistic object.

28. (Original) The system of Claim 1, wherein an exact spelling sequence is displayed in said text display area.

29. (Original) The system of Claim 1, wherein the last entered letter is indicated in said exact spelling sequence.

30. (Original) The system of Claim 2, wherein the last entered letter is indicated in said on-screen keyboard.

31. (Original) The system of Claim 1, further comprising a means to change the last entered letter.

32. (Currently Amended) A text input method using a directional input device, wherein each direction entered corresponds, directly or indirectly, to one or more linguistic object subcomponents according to a predetermined mapping, said method comprising the steps of:

for each user act of pointing the directional input device in a direction, preparing an output of candidate linguistic object subcomponents and associated probability weightings based upon factors including at least an angular difference between the direction indicated by the directional input device and pre-assigned directions of said linguistic object subcomponents according to the predetermined mapping;

~~preparing an output by applying the predetermined mapping to user-submitted directional input entries submitted via the directional input device, the output including candidate linguistic object subcomponents and associated probability weightings;~~

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for a given sequence of user acts of pointing, utilizing the output to construct a list of predicted linguistic objects potentially representing a linguistic object intended by the user through entry of the given sequence;

- 5 ~~retrieving a list of predicted linguistic objects from the dictionary-based~~  
~~upon the output;~~  
facilitating user selection of a desired linguistic object from said list.

33. (Currently Amended) The method of Claim 32, the directions indicated by the directional input device comprising ~~the user submitted directional input~~  
10 ~~entries comprising~~ angular direction, wherein the angular direction is derived from recording the X-Y offset of the directional input device and converting that offset into an angular notation comprising radians, gradients, or degrees.

34. (Original) The method of Claim 33, wherein the conversion is a variation  
15 on the standard Cartesian to Polar formula of  $\text{Angle} = \arctan(Y/X)$ .

35. (Previously Presented) The method of Claim 32, wherein the candidate linguistic object subcomponents can be one of any number of adjacent or nearby letters or symbols.

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36. (Previously Presented) The method of Claim 32, further comprising utilizing a linguistic model to order said list of predicted linguistic objects according to likelihood of intended selection by the user.

- 25 37. (Previously Presented) The method of Claim 32, wherein the linguistic objects comprise words and the linguistic object subcomponents comprise letters.

38. (Canceled)

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39. (Canceled)

40. (Currently Amended) The method of Claim 36, wherein the order of said  
5 list of predicted linguistic objects is based on a combination value of a calculated  
~~weighted distance value of the weightings~~ and the linguistic model.

41. (Previously Presented) The method of Claim 36, wherein the linguistic  
model comprises one or more of:  
10 frequency of occurrence of a linguistic object in formal or conversational  
written text;  
frequency of occurrence of a linguistic object when following a preceding  
linguistic object or linguistic objects;  
proper or common grammar of the surrounding sentence;  
15 application context of current linguistic object entry; and  
recency of use or repeated use of the linguistic object by the user or within  
an application program.

42. (Canceled)  
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43. (Previously Presented) The method of Claim 32, wherein said directional  
input device is associated with an on-screen keyboard.

44. (Original) The method of Claim 43, wherein said on-screen keyboard  
25 comprises a ring of letters, numbers or other symbols.

45. (Original) The method of Claim 43, wherein said on-screen keyboard is  
represented in Polar or Cartesian coordinate system for calculation.



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46. (Currently Amended) The method of Claim 32, wherein construction of said list of predicted linguistic objects includes retrieving linguistic objects ~~said list of predicted linguistic objects is retrieved~~ from a vocabulary database, and wherein a plurality of linguistic objects stored in said vocabulary database is  
5 ordered according to a linguistic model.

47. (Original) The method of Claim 46, where said linguistic model comprises one or more of:  
frequency of occurrence of a linguistic object in formal or conversational  
10 written text;  
frequency of occurrence of a linguistic object when following a preceding linguistic object or linguistic objects;  
proper or common grammar of the surrounding sentence;  
application context of current linguistic object entry; and  
15 recency of use or repeated use of the linguistic object by the user or within an application program.

48. (Original) The method of Claim 46, wherein said plurality of linguistic objects is stored in a mixed case format in said vocabulary database.  
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49. (Original) The method of Claim 46, wherein said vocabulary database further comprises a user database which stores linguistic objects added by the user.

25 50. (Original) The method of Claim 49, wherein said linguistic objects added by the user in said user database are ordered by length of linguistic object and recency of use.

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51. (Original) The method of Claim 46, wherein said vocabulary database further comprises a recency database to support linguistic object prediction based on recency of use.

5 52. (Currently Amended) The method of Claim 36, where the order of each linguistic object in the list is based at least in part upon a mathematical function of probability weightings for all linguistic object subcomponents in the linguistic object.

~~40, wherein said calculated weighted distance value is calculated based on the angular difference between each selected direction and the corresponding letter or symbol in predicted linguistic objects.~~

53. (Previously Presented) The method of Claim 32, where the factors additionally include, for each linguistic object subcomponent, a frequency of use  
15 of that linguistic object subcomponent.

54. (Previously Presented) The method of Claim 32, wherein the user selects a partial linguistic object and continues with more directional inputs.

20 55. (Original) The method of Claim 54, wherein said list of predicted linguistic objects is filtered to only include linguistic objects that begin with said selected partial linguistic object.

56. (Previously Presented) The method of Claim 32, wherein the user selects  
25 an entry from said list of predicted linguistic objects and the highest-ranked linguistic object containing said selected entry remains selected upon the input of additional linguistic object subcomponents until said entry becomes invalid by further addition of linguistic object subcomponents.

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57. (Previously Presented) The method of Claim 32, wherein said directional input device includes a set of buttons.

5 58. (Previously Presented) The method of Claim 32, wherein said directional input device includes a joystick or omni-directional rocker switch.

59. (Previously Presented) The method of Claim 43, wherein said on-screen keyboard further comprises a smart punctuation symbol, said smart punctuation  
10 symbol when retrieved is automatically interpreted as a punctuation symbol, diacritic mark or tonal indication at the place in the input sequence where a matching punctuation symbol, diacritic mark or tonal indication occurs in predicted linguistic objects.

15 60. (Previously Presented) The method of Claim 32, wherein a set of buttons or a second directional input device can be used alone or with said directional input device, separately or simultaneously, to switch or choose input modes, to change from input to word selection, or to invoke other functions.

20 61. (Currently Amended) The method of Claim 32, further comprising the steps of:  
invoking an undo means after selecting a linguistic object from said list of predicted linguistic objects; and  
re-displaying said list.  
25 ~~displaying the previous retrieved linguistic object subcomponents and showing previously retrieved list of predicted linguistic objects.~~

62. (Currently Amended) The method of Claim 32, further comprising the steps of:

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selecting a linguistic object from a text message; and  
displaying subcomponents letters of said linguistic object as if said  
subcomponents had been entered exactly and constructing a predicted list of  
linguistic objects based on the displayed subcomponents.

5 ~~showing a retrieved list of predicted linguistic objects corresponding to said  
subcomponents.~~

63. (Currently Amended) A text entry input module for use with user interface  
components including a direction indicator and a output device with a text display  
10 area, the text entry input module comprising:

a database of linguistic objects;

a predetermined set of linguistic object subcomponents;

~~wherein a preestablished relationship exists between angular directions of  
the direction indicator and subcomponents of linguistic objects in the dictionary;~~

15 where a predetermined relationship exists between said linguistic object  
subcomponents and different assigned angular directions of the direction  
indicator;

~~a calculation module to apply the preestablished relationship to each user-  
submitted direction entered via the direction indicator to provide an output, said  
20 output including: multiple predicted linguistic object subcomponents and, for  
each predicted linguistic object subcomponent, an associated proximity  
weighting;~~

a calculation module to apply the predetermined relationship to each user-  
submitted direction entered via the direction indicator to provide an output, said  
25 output including: (1) multiple predicted linguistic object subcomponents including  
a group of linguistic object subcomponents whose assigned angular directions  
are nearest the user-submitted directions, and (2) for each predicted linguistic  
object subcomponent, an associated proximity weighting proportional to an  
angular difference between the user-submitted direction and the angular direction  
30 assigned to the predicted linguistic object subcomponent;

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an object search engine configured to utilize the output to retrieve from the database dictionary a list of predicted linguistic objects potentially representative of the user-submitted directions;

- 5 a linguistic object module programmed to utilize at least one predetermined linguistic model to order said list of potential linguistic objects according to likelihood of intended selection by the user;

a selection component to facilitate user selection of a desired linguistic object from said ordered list of predicted linguistic objects.

- 10 64. (Previously Presented) A text entry input module for use with user interface components including a direction indicator and an output device with a display, the text entry input module comprising:

a vocabulary database of linguistic objects;

- 15 a mapping between angular directions of the direction indicator and linguistic object subcomponents;

a calculation module to apply the mapping to each user-submitted direction entered via the direction indicator to provide an output including: multiple potentially user-intended linguistic object subcomponents and associated proximity weightings;

- 20 an object search engine configured to retrieve a list of predicted linguistic objects from the vocabulary database based upon said calculation module output;

- 25 a linguistic object module programmed to utilize a linguistic model to order said list of predicted linguistic objects according to likelihood of intended selection by the user; and

a selection component to facilitate user selection of a desired linguistic object from said ordered list of predicted linguistic objects.

- 30 65. (Canceled)

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66. (New) A computer readable storage medium tangibly embodying a program of instructions executable by a digital data processing machine to perform text input operations comprising:

5 receiving machine-readable signals representing a series of user-submitted directional inputs entered via a directional input tool, the series having an order;

where directional inputs of the directional input tool correspond to different linguistic object subcomponents according to a predetermined mapping;

10 for each user-submitted directional input, based upon that directional input alone, estimating multiple corresponding subcomponents that the user might have intended by such directional input, and providing a weighting value that the user intended each such subcomponent;

15 assembling the different ones of the estimated subcomponents to construct multiple different proposed linguistic objects that the user might have intended by the series of directional inputs, where each proposed object includes one estimated subcomponent for each user-submitted directional input, the subcomponents occurring in the proposed object in the same order as the series of user-submitted directional inputs;

20 facilitating selection of a desired one of the proposed objects.

67. (New) The medium of claim 66, where each linguistic object subcomponent comprises at least one of the following:

25 an alphabetic letter, numeric digit, symbol, character;  
a sub-word component from a non-English language including one or more strokes, radicals, jamos, kana, punctuation symbols, digits;  
a subcomponent or combination of one or more of the foregoing.

68. (New) The medium of claim 66, the assembling operation further comprising:

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ordering proposed linguistic objects according to considerations including one or more of the following: presence in a predetermined vocabulary, presence in a user-defined list, frequency of general usage.

5 69. (New) The medium of claim 66, the estimating operation further comprising:

for each user-submitted directional input, identifying linguistic object subcomponents within a predetermined angular range thereof according to the predetermined mapping;

10 limiting the estimated subcomponents to those identified.

70. (New) The medium of claim 66, the operation of providing a weighting value comprising at least one of the following:

15 providing a weighting value for each linguistic object subcomponent according to angular proximity between the subcomponent's corresponding actual user-submitted directional input and the directional input exactly mapped to the subcomponent;

providing a weighting value depending at least in part on frequency of general usage of the subcomponent.

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71. (New) The medium of claim 66, the operations further comprising:

responsive to receiving each machine-readable signal representing a user-submitted directional input, displaying a pie wedge indicating a current direction of the directional input tool and a range of linguistic object

25 subcomponents within that range.

72. (New) The medium of claim 71, the operations further comprising:

narrowing the displayed pie wedge and corresponding range in proportion to magnitude of the directional input.

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73. (New) The medium of claim 66, where the predetermined mapping is such that linguistic object subcomponents occupy greater angular ranges responsive to factors including greater frequency of general usage.

5 74. (New) The medium of claim 66, where the assembling operation further comprises identifying supplemental linguistic objects that contain the proposed linguistic objects and include further subcomponents, and including the supplemental linguistic objects in the proposed linguistic objects.

10 75. (New) The medium of claim 66, where the assembling operation further comprises ordering the proposed linguistic objects according to one or more of the following: word length, ordinal ranking, weighting value of proposed linguistic object subcomponents, frequency of general usage, recency of use, appearance in a user-defined list.

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76. (New) A computer-assisted method of text entry, the operations comprising:

by using a joystick having predefined mapping between different actual radial directions and different text characters, a user sequentially pointing in an intended radial direction toward intended characters of at least part of an intended word;

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the computer determining angular similarity between each actual pointing direction and radial directions of different characters in the mapping, and using the determined angular similarity to compute different possible combinations of intended characters that could form the intended word and their associated likelihoods, and presenting a list of potential matching words to the user, where the presentation favors potential matching words according to factors including an aggregate angular similarity of constituent characters of a potential matching word to the actual pointing directions;

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the user selecting the intended word from the list;

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the computer displaying the selected word in a human-readable message  
composition display area.